



Implementing Fixed Income Attribution

Practical Choices
and Implications



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Framing the Effort

- Key, up-front choices affect FI PA implementation with regard to:
 - Human resources
 - Implementation time
 - User acceptance
 - Risk
 - Technology
 - Production capacity



High-Level Questions

- Who will the clients be?
- Where are the input data gaps?
 - Existence
 - Integration
 - Quality
- What is the detailed methodology?
- How will results be delivered?



Clients of Attribution

Choices	Implications
Portfolio Management	<ul style="list-style-type: none">■ Daily, with MTD and YTD■ Flexible drill-down■ High accuracy
Marketing	<ul style="list-style-type: none">■ Flexible benchmark construction■ Flexible account groups■ Long history
Client Services	<ul style="list-style-type: none">■ Summarized results■ Presentation quality delivery■ Pricing effect reconciliation
Operations & Data Quality	<ul style="list-style-type: none">■ Daily■ Performance measurement■ Detailed drill-down

The Biggest Input Data Gap

- Do you have a portfolio Performance Measurement system that:
 - Produces weights, returns and contributions,
 - At the holding level,
 - Both price and accrual,
 - Such that the sum of the contributions equals the reported portfolio return,
 - For every time period?



Potential Holdings Performance Potholes

- Even if you think the answer is “Yes”, have a look at:
 - Futures weights and contributions
 - Margin variation
 - STIF and other cash return frequency
 - MBS paydowns
 - Intra-day flips, zero-crossing



Other Holdings Performance Choices

- Calendar – weekends & holidays
- First/last day pricing
- Back/forward fill
- Exposure weighting vs. reported weighting



Holdings Analytic Inputs

- Effective duration, key rate durations, convexity, OAS, etc.
- Quality of operational integration of analytics source
- First/last day
- Back/forward fill
- Length of history available



Holdings Classification Inputs

- Type, industry, country, etc.
- If using a vendor scheme, setup for non-benchmark issues
- First/last day
- Back/forward fill
- “Other” bucket



Benchmark Performance Inputs

- For each required benchmark
- Non-core sectors (high yield, international, muni)
- Constituent or aggregated
- Price & accrual
- Daily, MTD or index
- Current operational integration



The 2nd-Biggest Input Data Gap

- Do you have benchmark analytics data
 - For all the required benchmarks (including non-core sectors),
 - At the necessary level (constituent/bucket),
 - With the necessary frequency,
 - Consistent with holdings analytics data items and calculation methodology,
 - Operationally integrated?



Benchmark Classification Inputs

- If using in-house scheme, need system for classifying all constituents



Other Inputs

- FX Rates
 - Timing, relative to pricing
- Yield Curves
 - Methodology, relative to key rate durations
 - Multiple currencies/countries
 - 30-year



Backfilling History

- Availability?
 - Holdings & benchmark
 - Performance, analytic & classification
 - Periodicity
- December 31st
- Consider justifying and implementing this separately from the main FI PA effort

Methodological Choices

- “Factor” vs. “Strategy”
- Pricing effect
- Time-period linking



“Factor” vs. “Strategy”

- Factor or effect-based attribution most common
- Strategy-based groups benchmark-relative positions into long/short strategies
 - Lot-level holdings data for accurate actual attribution
 - Or, attribute Model Strategy portfolio only



Pricing Effect

- In-house pricing hierarchy, vs. benchmark vendor pricing
- Affects weights, returns, analytics, excess returns, allocation/selection
- Continuum of reconciliation methods
 - MAX: calculate performance, analytics and attribution twice, report on differences
 - MID: use in-house pricing/analytics where available, report difference at totals
 - MIN: ignore, use benchmark pricing



Time-Period Linking

- Some methodologies can make use of cumulative “adjustment factors”
- Affects pre-calc vs. re-calc design
- In turn, affects response time for interactive delivery



Delivering the Results

- **Immediacy**
 - Pre-formatted batch reports
 - On-request reports
 - Interactive
- **Flexibility**
 - Drill-down order and depth
 - Alternate benchmarks
 - Time-period start/end
- **Integration with enterprise delivery platforms**
 - Online intranet, portals

Design Choices and Implications

- Existing Data Warehouse
- New Data Structures
- Production Cycle
- Interactive Delivery



Existing Data Warehouse

- Adding Benchmark Data
 - Large number of issues
 - Multiple vendors
 - To scrub or not
 - Integrate with holdings structures, or separate



New Data Structures

- New structures for entity-specific performance
 - Return factors
 - Cumulatives, and “adjusted” performance
- New structures for attributions, keyed by:
 - Portfolio, sub-portfolio or group
 - Benchmark
 - Period
 - Methodology (if more than one in use)



New Data Structures (cont.)

- Bucket-level data
 - Aggregated up from holdings/constituents
 - Persistent
 - The issuer problem
 - Granularity
 - Fine = Flexible



Production Cycle

- Benchmark vendor availability
- Analytics availability
 - Including benchmark constituents!
- Performance Measurement completion
- Performance revisions and “as-of” processing



Interactive Delivery – Pre-calc vs. Re-calc

■ Pre-calc

- Maximum interactive response
- Use of cumulative results
- Revisions problem
- Limits to benchmark flexibility
- Heavy on disk space

■ Re-calc

- Limits interactivity, particularly drill-down
- Eliminates revisions problem, benchmark limits
- Light on disk space

Summary of Biggest Factors

- Performance Measurement
- Benchmark Analytics
- Results:
 - Flexible vs. pre-specified
 - Interactive vs. batch